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In Pursuit of Time: Business plan sequencing, duration and intraentrainment effects on new venture viability

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Abstract

In this study, we examine three under-explored dimensions of the temporal relationship between formal written business plans and the achievement of new venture viability. First, we theorize and investigate the effects of plan sequencing; arguing that a business plan written early on in new venture development increases the prospects of venture viability. Second, we examine plan duration effects, and argue that there is a curvilinear relationship between spending time on a plan and achieving venture viability. Finally, we investigate plan intraentrainment effects (synchronization with other gestation activities). We theorize that if plans are synchronized with other gestation activities, venture viability is more likely. Using longitudinal data and controlling for truncation and endogeneity issues, we find that it pays-is beneficial to plan early but that this is contingent on how long a founder spent on a plan and whether or not a plan is intraentrained with other gestation activities.

Keywords: temporality, nascent entrepreneurship, business plans, intraentrainment effects

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1. Introduction

Prior studies have provided conflicting insights into the relationship between formal written business plans and nascent venture outcomes. Delmar and Shane (2003) show that a formal plan helps to better direct and orchestrate new venture gestation activities. In contrast, Lange et. al., (2007) argue that a plan is less valuable, and that founders are better off enacting rather than evaluating an opportunity. Honig and Karlsson (2004) further identify that the main function of a scripted plan is to act as a legitimation device for convincing external stakeholders of the efficacy of the fledgling venture. One issue, however, that these divergent accounts have failed to examine fully is the temporality of the plan-performance relationship. This is surprising because studies that draw on emergent (Mintzberg and Walters, 1985), isomorphic (Honig and Karlsson, 2004) or rational synoptic approaches (Ansoff, 1991) all implicitly embed their theoretical understanding of plans within time. However, none of these approaches explicitly theorizes, models, or tests plan timing effects which is surprising since “temporal issues uniquely and explicitly characterize the entrepreneurial process” (Bird and West, 1997: 5).

Our pursuit in this study is to theorize and empirically assess how formal plan timing effects impact on the achievement of new venture viability. We focus on formal scripted plans for two reasons (here a business plan is defined as a script that outlines the markets to be served, the provision of products/services, the resources required, and the expected growth of the nascent venture (Stevenson and Van Slyke, 1985)). First, plan formality occupies a central place in the extant strategic and entrepreneurship literature on the plan-performance relationship (Thune and House, 1970; Robinson and Pearce, 1984; Miller and Cardinal, 1994; Falshaw, Glaister and Tatoglu, 2006; Brinkmann and Kim, 2015). Second, if plans have any value, this is as an expression of goal-orientated behavior (Delmar and Shane, 2003).

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Consequently, we see that the timing of these goal statements is critical because “the formation of the goal is a key moment within the entrepreneurial journey and that the timing of this moment within the process matters” (McMullen and Dimov, 2013: 1503). Hence, as with Kim, Longest and Lippmann (2014, 2015) and Yang and Aldrich (2012), we see that the achievement of milestones such as early-stage profitability and first sales are landmark steps for the founder in reaching venture viability.

Further, better comprehending plan temporalities is important because it advances or ‘next steps’ (Locke and Golden-Biddle, 1997) the extant theoretical debate away from the usual question of whether or not plans are valuable to a more nuanced understanding of when, and for how long, a founder should formally plan. This endeavor has practical benefits because, although effectuation, bricolage and lean start-up approaches are now much more prevalent, formal plans remain central to how venture creation is taught to students and entrepreneurs in our universities (Honig, 2004). Business plans are also used by millions of founders each year (Gumpert, 2002), and by external financiers to screen business propositions (Parker and van Praag, 2006).

In this study, our contribution is to extend the entrepreneurial planning literature by investigating both absolute and relative temporal contingencies in the plan-performance relationship. In adopting a ‘temporal lens’ (Ancona et. al., 2001), we focus on formal plan timing effects in both absolute ‘clock time’ and relative ‘event’ time. Clock time relates to the objective linear beat of time, measured out in days, months and years. It is a resource (‘time is money’) that requires entrepreneurs to make decisions about when – and for how long - to conduct activities (Huy, 2001). In contrast, relative or ‘event time’ suggests that temporal patterns resides “within the event, activity or task” (Reinecke and Ansari, 2014: 8), thereby pointing to contingent temporalities.

Examining when a plan is written (sequencing) and how long is spent on it (duration) is significant because it points to important boundary conditions in the plan-performance relationship. Rather than seeing plans either as an unalloyed good or as a waste of time, one value of examining when a plan is written in ‘clock’ time is that it exposes if a plan scripted early on in new venture development actually increases venture viability prospects. Any advantage of early plans, however, may be lost if, as plan critics imply, too much time is spent on writing the plan. We also add to this literature by drawing on the notion of *intraentrainment* (i.e. the process by which internal activities and processes are synchronized to achieve outcomes) (Pérez-Nordtvedt et. al., 2008). This is important because, although the fit between a plan and other interdependent gestation activities is seen as a key advantage of a plan (Delmar and Shane, 2003), how intraentrained a plan is with other gestation activities has been only lightly studied. Consequently, investigating plan intraentrainment effects is valuable because it may reveal if plans written alongside other gestation activities promote venture viability and why some plans are little more than ceremonial devices (Honig and Karlsson, 2004).

To achieve this more nuanced understanding of plan temporalities, we empirically isolate plan timing-performance effects. We do this in three ways. First, we use the longitudinal Panel Study of Entrepreneurial Dynamics II (PSED II). In PSED II, the writing of a plan always precedes venture viability, thereby allowing us to draw better causal inferences. Second, we control for truncation issues that might lead to left or right censoring biases (Yang and Aldrich, 2012). Crucially, we also control for endogeneity in the plan timing-performance relationship by separating out selection from performance effects. Endogeneity is important because the resources and characteristics of the founder and their venture (selection effects) impact both on when, if at all, plans are written, and on the

chances of venture viability. For example, a better educated founder is likely to have higher levels of absorptive capacity (Dencker et. al., 2009). Subsequently, they may, for example, take less time to plan and be better placed to achieve viability landmark steps such as early stage profitability. In sum, because very many prior business plan studies conflate selection with performance effects, Burke, Fraser and Greene (2010) identify that a failure to adequately control for heterogeneity in founder and venture characteristics and resources results in biased estimates of the plan-performance relationship. To control for these selection effects, we use a propensity score matching approach. Its underlying logic is to match the resources and characteristics of one group, in our case, formal planners, with that of another group, non-planners, so that founder resources and characteristics are observationally equivalent. By matching or ‘netting out’ heterogeneity in founder characteristics and resources, (Li, 2013; Kaiser and Malchow-Møller, 2011; Rosenbaum and Rubin, 1983), the key advantage is that we are able to focus on the plan timing-performance relationship.

In the next section, we motivate our hypotheses. The research methods section details our data, the variables, and the estimation approach. We then provide our results before concluding by discussing the implications for scholars, practitioners and educators.

2. Theorizing Plan Timing Effects

2.1. Absolute and relative time

Despite Taylor’s (1947) ‘time and motion’ studies being at the genesis of subsequent understandings of managerial practices, management and entrepreneurship researchers have repeatedly emphasized that the role time plays in shaping organizational outcomes has been insufficiently investigated (Spector and Meier, 2014; Dawson, 2014; Bridoux, Smith and Grimm, 2013; Sonnentag, 2012; Crossan et. al., 2005). This is surprising because time “is as

fundamental a topic as any that exists in human affairs” (Bluedorn and Denhardt, 1988: 316) which “take a researcher into a conceptual terrain of events, episodes, activity, temporal ordering, fluidity and change” (Langley et. al., 2013: 10). A common way of understanding time is through the dichotomy between absolute and relative event time. Absolute clock time has variously been described as ‘chronos’, objective, mechanical, homogeneous, linear, given and quantitative. In contrast, relative event time is seen as ‘kairos’, subjective, heterogeneous, organic, lived and qualitative (Reinecke and Ansari, 2014).

Prior managerial research has mainly focused on understanding how decision speed shapes organizational outcomes. Following on from Eisenhardt (1989), this stream of ‘clock time’ research identifies that those that either ‘beat or keep up with the clock’ are more likely to perform better (Baum and Wally, 2003; Talaulicar, Grundei and Werder, 2005; Forbes, 2005; Stanko, Molina-Castillo and Munuera-Aleman 2012). In entrepreneurial settings, the focus has also been on the impact of decision speed, with the assumption being that those that are better able to economize and allocate time are more likely to achieve their organizational goals (Huy, 2001). However, studies show that being quicker does not always lead to better outcomes (Capelleras et. al., 2010; Perlow, Okhuysen and Repenning, 2002). Indeed, some studies point to the value of taking time to create the new venture (Kim et. al., 2014, 2015; Parker and Belghitar, 2006).

Rather than decision speed (absolute time) being pivotal, event time researchers have theorized that organizations that are temporarily synchronized with their external environment achieve superior outcomes (Ancona and Chong, 1996; Khavul et. al., 2010). This differs from the traditional strategic fit questions that focus on ‘what’ or ‘how’ to achieve fit (Miles and Snow, 1978) by arguing that questions of ‘when’ activities are done are also important in determining outcomes. This has led researchers to draw on the entrainment

model first proposed by McGrath and Kelly (1986) to identify that when activities are ‘entrained’ - “the process by which activity cycles of one system synchronize to those of another, more dominant system” (Khuval et. al., 2010) – with external pacers (e.g. a dominant supplier) it can lead to positive benefits in terms of greater internationalization (Khavul et. al., 2010), greater innovation (Dibrell, Fairclough and Davis, 2015), and the better performance of strategic alliances (Shi and Prescott, 2012).

However, while recognizing that fit with the external environment (i.e. extraentrainment) is important, Perez-Nordvedt et. al., (2008: 11) argue that for existing organizations their “internal activities and processes should be entrained as well (i.e. intraentrainment) for the organization to maximize fit and performance”. This is supported by Brown and Eisenhardt (1997) who identify that the fit-performance relationship is often dependent on how well managers are able to co-ordinate internal activities. Crossan et. al., (2005: 142) also identify that a failure to properly intraentrain activities can have damaging consequences: “a lack of temporal fit between the individual and organization will impede, or completely block, the alignment between the organizational and environmental rhythms”. Furthermore, Clark (1985) suggested that an organization’s ability to intraentrain activities is important in turbulent uncertain settings, reflecting that events do not follow an “orderly, managerially imposed timeline and timetable comprised of discrete, measurable activities with predictable durations, sequencing, and interactions” (Saunders et. al., 2004: 24). Intraentrainment, however, has not been examined fully in nascent settings. In finding that nascent venturing does not follow linear patterns, many studies, however, hint at the importance of intraentrainment (Reynolds and Miller, 1992; Bhavé, 1994; Carter, Gartner and Reynolds et. al., 1996; Liao, Welsch and Tan, 2005; Manolova et. al., 2012). More specifically, Lichtenstein et. al., (2007) show that gestation activities are modulated by their

pace, concentration and timing with venture outcomes being more likely when there is a high rate of start-up activities, when these are spread out, and when activities are conducted later rather than early on in the venture creation process. Gersick (1994) also shows that relative event time is important. Nonetheless, what her study of an internet start-up shows, above all, is that both absolute and relative timing effects are important to the achievement of the start-up goals: entrepreneurs set deadlines for activities but they are also conscious that intraentraining activities are important.

In summary, although entrepreneurship is time sensitive (Lichtenstein et. al., 2007), studies have mainly focused on questions such as whether a founder should plan and whether plans delay or foster new venture outcomes. Subsequently, while such research is valuable, it is not clear what role plan sequencing, duration or synchronization plays in the achievement of new venture viability.

2.2. *Hypotheses*

Although few studies explicitly focus on plan sequencing effects, studies that draw on an emergent strategic approach (Mintzberg and Waters, 1985) identify that since nascent venturing is inherently uncertain, a plan is unlikely to provide benefits if written early on. Information collected early on in absolute time is likely to be too fuzzy (Castrogiovanni, 1996), partly because it is difficult in the absence of reliable market or competitor information to evaluate the opportunity (Fredrickson, 1984; Fredrickson and Iaquinto, 1989), but also because uncertainty makes it likely that the opportunity itself changes (Andries and Debackere, 2007). Writing a plan also has opportunity costs in terms of both time and resources. Therefore, plan critics argue that founders are better off enacting rather than evaluating the opportunity (Lange et. al., 2007). These studies also indicate that there are few

benefits from the late writing of a plan: for instance, although as time goes by the shape of the opportunity may be clearer, and consequently uncertainty is likely to be reduced, Carter et. al., (1996) suggest that founders gain more benefits by conducting activities that continue to advance the venture rather than writing a plan which simply confirms its progress.

Similar implications can be drawn from isomorphic accounts of business plans (Honig and Karlsson, 2004; Karlsson and Honig, 2009; Honig and Samuelsson, 2012, 2014). These studies suggest that founders plan in response to mimetic, coercive and normative pressures. Hence, they plan because they are following prevailing norms about what a founder ought to do (normative), because they observe others writing a plan (mimetic), and because they respond to external pressures from outside stakeholders to write a plan (coercive). Although Honig and his colleagues do not focus explicitly on plan temporality, they do find that plans have few benefits, suggesting that it is largely a ceremonial device which does little to reduce uncertainty or help scope out the venture.

Our first argument, though, is that if a plan is completed early on in absolute time it is likely to have a higher probability of achieving new venture viability milestones such as early-stage profitability. This is for several reasons. First, linear causal models such as Katz and Gartner's (1988) BRIE model (Boundary, Resources, Intentions and Exchange) imply that plans should be written early on in new venture development because a plan acts as an orchestration device that reduces complexities and uncertainties into measurable and controllable entities (Aldrich, 1999; Delmar and Shane, 2003). In other words, drawing on purposive planning (Ansoff, 1991) and goal theory (Locke and Latham, 2002), we argue, as Delmar and Shane (2003) do, that a plan written early on increases the likelihood of viability because it serves as a boundary spanning goal statement which temporally paces out nascent venturing activities. As such, it strengthens the link between action and performance (Frese

et. al., 2007), improves the potential for learning synergies between planning, action and reflection (Corbett 2005, 2007), anticipates the timing of resource flows, and promotes the speedy matching of resource supply and demand (Gruber, 2007). This echoes findings which suggest that setting a temporal schedule creates predictability which, in turn, helps individuals to feel confident and in control (Brown and Eisenhardt, 1997). Moreover, besides potentially promoting goal commitment and persistence (Liao and Gartner, 2006), we argue that early planning helps enhance the credibility of the fledgling venture among both internal and external stakeholders (Burke et. al., 2010; Chwolka and Raith, 2012). By contrast, we argue that there are few advantages to writing a plan late in new venture development. Late plans are unlikely to cue, monitor or meter very many future nascent activities and instead may indicate that either the plan is a ceremonial device (Karlsson and Honig, 2009) or suggest that the founder would have been better off actively pursuing the opportunity rather than evaluating it (Lange et. al., 2007). In sum, for our first hypothesis, we posit that:

H1: Completing a scripted plan early on in the development of the new venture increases the likelihood of new venture viability.

The second dimension of the plan timing-performance relationship that we consider is the duration of time spent on the formal plan. Like Gielnik et. al., (2014), we see that there comes a point in time where founders have to shift from evaluating an opportunity to enacting it by committing resources and implementing actions (Lange et. al., 2007). Taking too long on a plan can lead to ‘analyzing ideas to death’ (McGrath and MacMillan, 2000: 3) and the ‘paralysis of analysis’ (Peters and Waterman, 1982). Similarly, at some point, a founder will have gained most of the information that can be known: beyond this industry and market uncertainties are irreducible (Bhide, 2000). We argue that prompt planning promotes venture

viability not only because it enhances opportunities to realize first mover advantages (Chen, Reilly, and Lynn, 2012), but also because it provides information that can be used to estimate resourcing costs (Langerak and Hultink, 2005). This is advantageous because, for example, if the plan takes perhaps more than three months to complete, it is likely that much of the market information on costs and customers will have changed. Swift planning may also provide reliable information that can be used to better test the opportunity, thereby enhancing learning about the venture and allowing for the founder to judge if, for example, the risks outweigh the rewards (Menon, Chowdhury, and Lukas, 2002). Consequently, founders face trade-offs which suggests that there are positive returns to a plan but only up to a point: beyond this there are decreasing benefits from spending time on a plan. Hence, we argue that plan duration has a curvilinear impact on the plan-performance relationship: there is an inflection point where the founder no longer realizes increasing returns from a plan and, instead, begins to realize decreasing returns. Hence, we posit that:

H2: There is a curvilinear (inverse u-shaped) relationship between new venture viability and the length of time spent on a formal plan. Spending time on a plan increases the likelihood of new venture viability but only up to a point beyond which time spent on a plan does not increase the likelihood of new venture viability.

As with Gersick (1994), crucial to our theorizing is that although clock time effects are important in pacing out the journey towards venture viability, so, too, is whether a plan is intraentrained with other gestation activities. This is important because marking out time solely in terms of absolute clock time generates faulty rhythms and the potential for a temporal misfit between activities and goals (Brown and Eisenhardt, 1997; Gersick, 1994). One example of this is a founder who completes a plan early on in the new venture. Such a goal statement may set deadlines and organize future activities. However, if the plan is temporally divorced from other activities, it may not resolve the inherent informational

fuzziness of the entrepreneurial opportunity (Bhide, 2000). Hence, while there may be advantages in writing a plan early on, we see that a plan that is synchronized with other activities is more likely to guide resourcing, identify a viable route to market, and cue sales, marketing and operational activities (Bhide, 2000). A plan that helps direct other activities conducted at around the same time may also help founders realize, for example, that the venture lacks viability. Moreover, gestation activities have a high degree of interdependence and it may be that the advantages of a formal plan - in developing learning synergies between plans and actions, creating momentum and smoothing the resource allocation process (Shi and Prescott, 2012) - only become apparent when it is intraentrained with a range of other gestation activities. For example, as an orchestration device, an intraentrained plan may strengthen the cumulative effect of multiple other gestation activities because it provides timely cues to help resolve allocation decisions about scarce resources and creates a sense of how far the founder has travelled on the 'entrepreneurial journey' and how far they have yet to travel (Standifer and Bluedorn, 2006). Consequently, we follow Liao and Gartner (2006) and Lichtenstein et. al., (2007) and argue that if a plan does help guide venture outcomes, it should be synchronized with a range of other gestation activities. In effect, as with plan duration effects, we envisage that an intraentrained plan has a curvilinear impact on the likelihood of venture viability, such that there is an increasing marginal benefit from a plan synchronized with other organizing activities, but that the marginal benefit of a plan decreases if it is done too distant from other activities. In other words, a plan should be temporally congruent with other gestation activities. Our final hypothesis, therefore, is that:

H3: There is a curvilinear (inverse u-shaped) relationship between the likelihood of new venture viability and when a formal plan is completed in relative event time. If a plan is completed alongside other gestation activities it leads to the creation of a new viable venture but not if it is completed too early or too late in relation to these activities.

3. Data and Methods

3.1. Data

Our data are the second Panel Study of Entrepreneurial Dynamics (PSED II). Using the PSED II has several advantages. One is that it is a representative survey of nascent entrepreneurial activities in the United States (Reynolds and Curtin, 2011). It began in late 2005/early 2006 with the screening interviews of 31,845 individuals. This screening ensured that the data was representative and issues caused by potential survivorship biases were minimized. 1,214 nascent entrepreneurs (i.e. those that were intending to start a new venture, had previously carried out at least one start-up activity, expected to own part of the venture, and did not have an existing operational business) were identified. These founders were followed over successive waves. The number of respondents falls – as is common with longitudinal data (Davidsson and Gordon, 2012) – across successive waves: 972 for Wave B and 746, 526, 435 and 375 for Waves C to F, respectively. Another advantage of PSED II is that it provides rich data on founder characteristics, gestation activities and venture characteristics (Reynolds and Curtin, 2011). A third advantage of the study is that it longitudinally follows founders over five subsequent annual waves (2007-2011). At each wave, monthly indications of gestation activities started and finished were taken, facilitating causal inferences on the relationship between gestation activities and later venture outcomes¹.

3.2. Resolving truncation issues within PSED II

Yang and Aldrich (2012) identify that left and right censoring biases are temporal issues that have to be controlled for in using PSED II data. Left censoring occurs when an event (e.g. new venture viability) has occurred before study enrolment. This is not an issue with PSED II: it only samples founders that are at the time of the first interview in 2005 (Wave A) trying to

build a new venture. Nonetheless, PSED II data does show that, on average, prior to Wave A, founders had spent around two years on venture gestation activities. In addition, there may be right censoring biases if the founder leaves the study before it is possible to identify whether or not they achieved venture viability.

We resolve these truncation issues in four ways. First, like Yang and Aldrich (2012), we truncate our sample to those founders whose gestation activities began 120 months (10 years) prior to Wave A. This reflects that founders that spent more than 10 years preparing a new venture prior to Wave A are unlikely to be serious about new venture creation (Mueller, 2006). Excluding these founders reduces our sample from 1,214 to 1,100. Second, in our propensity score approach (see section 3.5 below) we explicitly matched planners and non-planners on their reported founder and venture characteristics and resources, thereby minimizing endogeneity concerns. Third, in our results, we explicitly account for the months spent on gestation activities prior to the Wave A interview (see ‘age at entry’ variable in Table 1). Finally, to control for right censoring biases, we follow Dimov (2010) and Yang and Aldrich (2012) and treat these subjects as ‘still trying’ to create a new venture². In overall terms, having controlled for left and right censoring issues, and because of there were 18 founders for whom there was incomplete information, our final sample was 1,088.

3.3. *Dependent variable*

Our core measure of venture viability is early-stage profitability. This is operationalized using PSED II QA35: ‘when monthly revenues exceed monthly expenses for six out of 12 months; including salaries for the managers’ as our dependent variable (1=if the monthly revenues exceed monthly expenses for six out of 12 months; including salaries for the managers; 0=otherwise). We use this as our main measure – like Kim et. al., (2015⁴) and

Yang and Aldrich (2012) – because achieving early-stage profitability (i.e. reaching positive operating cash flow) has been described as an appropriate proxy for venture viability: “the entrepreneurial journey concludes for the firm once that venture definitively realizes a profit or loss from activities related to that product.” (McMullen and Dimov, 2013: 1496). Early-stage profitability is also used as an important landmark step towards venture viability in the harmonized version of the PSED (Reynolds et. al., 2016). In our analysis, we report activities up to and including wave F. To arrive at those who do not achieve venture viability, we compare founders that achieved venture viability (A35) against those that disband their venture (A42, E51: 1=founders stop their venture activities and no-one else is working on the venture, 0=otherwise) and, to limit right censoring truncation issues, those that are ‘still trying’ to prosecute their venture (Davidsson and Gordon, 2012; Dimov, 2010). Second, as an ancillary measure of venture viability, we use the achievement of first sales (E14: 1=First revenue has been received from the sale of goods or services for this new business; 0=otherwise)³.

3.4. Independent variables

3.4.1. Formal and non-formal planners

We also follow the focus of the prevailing literature (Delmar and Shane, 2003; Karlsson and Honig, 2009) and distinguish between those who formally plan (Table 1: 269 observations: 25% of founders) and those who do not formally plan (QD2: ‘formally prepared’ business planners (1=yes; 0=otherwise)) (819 observations: 75% of founders).

3.4.2. Planning in absolute time (Hypothesis 1)

To measure when the plan was written in absolute time, we used the time stamp information in the PSED II to calculate the number of months from the founder's very first gestation activity to the completion of their plan. This number of months is always positive (one month or greater) since completing the plan never precedes the first gestation activity in PSED II data.

3.4.3. Plan duration (Hypothesis 2)

To measure plan duration, we calculated the difference between the month in which the founder began preparations for a business plan (QD3) and when they completed a business plan (QD4) for those that indicate the completion of the business plan (QD2).

3.4.4. Planning in relative event time (Hypothesis 3)

To examine when a plan is completed relative to other gestation activities, we first followed Liao and Gartner (2006) and determined the average event timing of non-plan gestation activities. This average event time is calculated as the total time it takes a founder to complete other non-plan gestation activities divided by the number of gestation activities they undertake. To arrive at this, we included all of the gestation activities conducted by the founder (34 possible gestation activities; Brush et al, 2008) and the total time window of 192 months available to complete gestation activities totals (120 months prior to Wave A and 72 months between PSED II waves A to F). For example, a sequence of seven gestation activities taking place in (months 1, 5, 8, 15, 23, 25, 42: total 119 months) results in an average event time of 17 (119 months/7 gestation activities). To calculate when the plan is completed relative to this average event time, we use time stamp information on which month the founder completed their plan (QD4). If the average event time was in month 17 and the

plan was completed in month 2, then planning preceded the average event time by 15 months. If planning took place in month 24, planning followed the average event time by 7 months. Hence, in our subsequent logistic regression results, negative numbers equate to a plan completed early relative to other gestation activities while positive numbers equate to a plan done later, relative to other gestation activities. Similarly, because again we are interested in showing the difference between when a plan is completed relative to the average event time, Figures 2b and 5 shows that if a plan is completed at the same time as the average event time, this is equated to month zero. If it is done before or after the average event time, these Figures also show the difference in time (number of months) between when the plan was completed (either negative or positive) and the average event time.

3.5. *Propensity Score Matching*

Following on from Burke et. al., (2010), we explicitly recognize that the founder and venture resources and characteristics are simultaneously both likely to affect the decision to plan and new venture viability. Controlling for these selection effects is important because they may lead to biased estimates of our plan-timing performance relationship. Hence, in a situation such as ours where we have observational rather than random assignment data, and the aim is to minimize selection effects in order to isolate performance effects, a common solution is to use propensity score matching. This approach is frequently used (Kaiser and Malchow-Møller, 2011; Rosenbaum and Rubin, 1983) because it can “produce an unbiased causal effect using observational data sets” and has the advantage of controlling for endogeneity by ‘balancing out’ heterogeneous differences between individuals who may or may not for example choose to formally plan. Matching therefore reduces “the problem of unfair comparison” (Li, 2013: 214). We subsequently follow Li (2013) and first assess the need for

matching on observable characteristics of the treated (planners) and the untreated (non-planners) (section 3.5.1) and then present results of pre and post matching (section 3.5.2). Next, having controlled for selection effects, we outline the three ways we test the plan timing-performance relationship (section 3.5.3). Finally, we identify how we examine unobservable heterogeneity in our plan timing-venture viability results (section 3.5.4).

3.5.1. Controlling for selection effects

Li (2013) suggests that it is important to establish if selection biases distort causal inferences on performance effects. We, therefore, examined founder and venture characteristics that are likely to affect the decision to plan and may thus bias subsequent performance effects. For founder characteristics, we used measures of generic (educational attainment: H6) and specific human capital (sectoral experience: H11; prior entrepreneurial experience: H13). We also drew on measures of ability expectations (PSEDII: Q.AY4-AY8; scales inverted so that higher values indicate higher levels of ability expectations; Cronbach's alpha: 0.68), start up commitment (Cronbach's alpha: 0.71, comparable to Dimov (2010)), work experience (H20: years), team size (AG2: number of founders), and time spent on the nascent venture (H16:1=35 hours or greater; 0=otherwise).

For venture characteristics, we drew on Dahlqvist and Wiklund (2012) who assessed innovative venture characteristics (S1: Higher values indicate more customer familiarity with product) and measured competitive pressures (S2: Higher values indicate more competition). Further, we assessed aspirations for venture growth (T1:1="I want this new business to be as large as possible", 0=otherwise), product/service complexity (composite measure of the level of novelty and technical expertise required to compete successfully (F4, F5, F8-10; scales inverted; Cronbach's alpha of 0.72)) (Kim et al., 2015), and sector (B1: dummies of service,

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retail and other industries (base category)). Also, because writing a plan might reflect the need to access financial capital we used two measures of external finance: if nascents were actually seeking financial capital (E 2: 1=yes; 0=otherwise); and how important their personal resources were to the venture (Q4-Q10: Total dollar amount invested of personal savings and other sources) (Reynolds, 2011). We also controlled for the time elapsed between the first gestation activity and Wave A (Yang and Aldrich, 2012).

3.5.2. *The results of pre and post propensity score matching*

We next sought to identify if these founder and venture characteristics affected the latent probability that founders are either formal planners (treatment group) or non-formal planners (control group). If these characteristics did effect the decision to plan, this would justify the use of propensity score matching as a means of adjusting for these selection effects (Li, 2013). Figure 1a shows that there were differences between founders in terms of their latent probability of completing a plan: planners were much more likely to complete a formal plan, reflecting underlying selection effects⁴, thus providing a justification for using propensity score matching to better eliminate these selection biases.

[Figure 1a about here]

Subsequent to applying the propensity score matching, Figure 1b shows that planners and non-planners have the same latent likelihood of completing a plan post matching (i.e. a plan is exogenous to observable founder and venture characteristics)⁵. This indicates that the propensity score matching approach has levelled out founder and venture differences between planners and non-planners. This suggests that endogeneity concerns have been minimized, thereby allowing us to focus on plan timing-performance effects.

[Figure 1b about here]

3.5.3. Testing for plan timing-performance effects

Subsequently, we test our three hypotheses in three ways. First, we provide logistic regression analyses of plan sequencing (H1), duration (H2) and intraentrainment (H3) effects on our core measure of venture viability (early-stage profitability). These analyses are both for the average effects over time and - because we are interested in inflection points and curvilinear effects - for banded monthly time periods (see the use of similar time segments in the harmonized PSED data, Reynolds et al, 2016) (Tables 2-4).

Second, because we are dealing with temporality, we recognize that one limitation of logistic regression analyses is that they are susceptible to right censoring bias. Yang and Aldrich (2012) show that founders that choose to respond to later PSED II waves are also more likely to become viable. Hence, logit analyses may oversample founders that achieve venture viability and thus artificially inflate our results. To control for right censoring, we therefore used flexible parametric survival specifications to assess if plan-timing effects impacted on the probabilities of achieving early stage profitability. Graphs of these specifications are shown in the results section (Figures 3-5)⁶. Finally, as a robustness check on our main early stage profitability measure of venture viability, we provide further logistic regression analyses of plan timing effects on first sales (see also Tables 2-4). The logistic regressions analyses for early-stage profitability (Tables 2-4 and Figures 3-5) and first sales (Tables 2-4) are in terms of the Average Treatment Effects on the Treated (ATTs) (i.e. the average effect of the treatment (formal plans) on performance (venture viability) for those that were treated (planners)).

3.5.4. Unobserved Heterogeneity

One limitation of these PSED II sample derived ATT results is that they may be sensitive to unobserved heterogeneity in founder and venture characteristics. For example, some founders may be simply unaware of formal planning as an option for supporting venture development. Hence, although the PSED II is, by design, a random sample of nascent founders, there still may be differences in plan propensities between founders sampled in the PSED and in the wider US population of founders. Li (2013) suggests that to control for confounding effects that may result from omitted variables, post hoc tests are to be conducted on the sensitivity of the treatment (i.e. plan) effects to unobserved heterogeneity. We used two tests. First, we assessed the sensitivity of our matching to unobserved heterogeneity using the methodology proposed by McCarthy et. al., (2013)⁷. Second, because PSED II is a random sample of founders, this allows us to also test if there are differences between our plan timing ATTs (effect for those that actually planned) and the wider population plan timing Average Treatment Effects (ATEs) estimates (i.e. the expected effects from a randomly selected unit of the population). Hence, by comparing the PSED II ATTs with the wider population ATEs, we can see if there are differences that would indicate the presence of unobservable heterogeneity in the ATTs and allow us to assess if the ATT results are generalizable to wider populations⁸. Results for these ATE tests are presented alongside the results (Tables 2-4) for both early-stage profitability and first sales.

4. Results

Before turning specifically to the results for each hypothesis, we begin in Table 1 by providing summary statistics and correlations. Table 1 shows that 22% of founders had created a new viable venture, which is comparable to other US new venture studies

(Reynolds, 2011; Spletzer et. al., 2004). It also shows, in terms of our ancillary measure of venture viability, that 66% of founders achieved a first sale compared to those that either disband their venture or were ‘still trying’. Further, Table 1 identifies that founders, on average, spent around 43 months in venture development. Table 1 also shows that founders completed their plan, on average, some 14 months into venture development; that the duration of planning was, on average, around 7 months, and that the average event time for planning was -2.00 (i.e. on average, planning is completed some two months prior to the average event timing of all other gestation activities). In terms of correlations, Table 1 shows that spending longer on venture creation reduces the prospects of achieving venture viability but that these effects are less evident for the first sale measure.

[Table 1 about here]

We also complement these results by graphically examining venture viability and non-viability in both absolute and average event time, and by considering the timing effects for four specimen BRIE markers: *Intentions* (business plan completion), *Resources* (Product development), *Boundary* (Government registration) and *Exchange* (paid unemployment insurance taxes) (see Appendix for a full list of all gestation activities used and their occurrence in both absolute and average event time) (Brush et. al., 2008)⁹. In terms of absolute time, Figure 2a shows there are three salient differences between viable and non-viable founders: 1) viable founders took, on average, 32 months to achieve venture viability (early-stage profitability) while the other founders remained in the process for some 46 months; 2) founders that achieved viability completed their plan in month 21, four months later than non-viable founders (month 17); and 3) founders tended to conduct gestation activities at similar times but there were differences in terms of BRIE gestation patterns:

founders of viable ventures first collected resources then wrote a plan (R,I,B,E), while founders of non-viable ventures wrote a plan then collected resources (I,R,B,E).

Examining plan effects solely in absolute time is, however, likely to generate faulty temporal insights that do not account for how intraentrained a plan is with other gestation activities. This is important because a plan written in isolation from other gestation activities may fail to help resolve the informational ambiguities surrounding the entrepreneurial opportunity or simply be a superfluous ceremonial device (Bhide, 2000; Honig and Karlsson, 2004). Figure 2b, therefore, examines average time effects for both founders of viable and non-viable ventures. Figure 2b shows that founders of viable ventures are more likely to concentrate their gestation activities around the average event time (i.e. activities are strongly synchronized with each other) whereas non-viable venture founders have a much wider dispersion pattern to their gestation activities, suggesting that for non-viable ventures, a plan is completed much earlier than the average event time, and is, consequently, less synchronized. Moreover, for founders of viable ventures, Figure 2b shows - for the four same BRIE markers used in Figure 2a - that the temporal ordering of BRIE activities (IRBE) differs from the order present in Figure 2a (RIBE). This provides some evidence that examining plans only in absolute time may provide faulty temporal insights. Figure 2b also shows that both types of founders typically have an I,R,B,E gestation pattern, but that business planning (I) happens much earlier and exchange (E) much later for founders of non-viable ventures. This, therefore, begins to indicate that it is not only when the plan is completed that matters but also how intraentrained it is with other activities.

[Figures 2a and 2b about here]

4.1. Hypothesis 1: Plan sequencing

We now turn from these graphical representations of temporal gestation patterns to assessing each of our three hypotheses. The logistic regression results in Table 2 shows that on average writing a plan has a positive impact on venture viability (early-stage profitability) ($\beta=0.16$, $p<0.01$), but that effects differ across time segments. If formal planners complete their plan within the first six months of venture development, they are no more likely than non-planners to reach viability. Similarly, there are few advantages in writing a plan after the first year. However, if founders plan in the period between 7-12 months ($\beta=0.079$, $p<0.01$) they are more likely than non-planners to achieve viability.

In Figure 3, we also examine, in continuous time, the impact of a plan completed in absolute time on the probability of early-stage profitability. Figure 3 shows that if planners complete their plan around month 10, they are much more likely to achieve venture viability. In terms of the ancillary venture viability measure, Table 2 shows that there is a negative effect of formal planning on achieving a first sale in the first 6 months; and that between months 7-24 there are positive but decreasing formal plan effects. Overall, the key finding from both Table 2 and Figure 3 is that if planners complete plans in the second half of their first year of venture development, they are more likely than non-planners to achieve venture viability. Since completing a plan in the second half of the first year is still earlier on in venture gestation, this provides support for H1.

[Table 2 and Figure 3 about here]

4.2. Hypothesis 2: Plan Duration

In Table 3 and Figure 4, we examine plan duration effects. Table 3 shows that, on average, time spent on planning has a negative effect on achieving venture viability ($\beta=-0.005$,

$p < 0.01$). Disaggregated into specific time periods, Table 3 shows that spending up to three months (time 0-3 months) ($\beta = -0.202$, $p < 0.01$) or between three and six months on planning ($\beta = -0.093$, $p < 0.013$) has a negative effect on the probability of achieving venture viability. This suggests that there are curvilinear effects of plan duration on achieving early stage profitability. These are most apparent in Figure 4. This continuous duration measure shows a curvilinear effect of time spent on completing a plan: the probability of achieving viability is positive at around 12 percentage points if the founder started and completed their plan in a three-month period, but that these advantages dissipate if further time is devoted to the plan.

[Table 3 and Figure 4 about here]

Moreover, Table 3 also shows the results of time spent on planning in relation to achieving a first sale. This reveals that spending up to three months only on formal planning is likely to lead to achieving a first sale ($\beta = 0.137$, $p < 0.1$) but that this likelihood turns negative if more time is spent on completing a plan (e.g. 3-6 months: $\beta = -0.052$, $\beta = -0.097$). Overall, therefore, the cumulative evidence from Table 3 and Figure 4 suggests support for H2.

4.3. Hypothesis 3: Plan intraentrainment

In Table 4, we assess plan intraentrainment effects on venture viability. This table shows that the average effect of an intraentrained plan is positive and significant ($\beta = 0.004$, $p < 0.01$). However, in terms of specific time periods, Table 4 shows curvilinear effects. Those founders that completed their plan 0.5-3 months before ($\beta = -0.156$, $p < 0.1$) or more than 2 months after ($\beta = -0.017$, $p < 0.01$) the average event time had a lower probability of reaching viability. But if they complete a plan in the 0.5-2 month period relative to the average event time, they had a higher probability of achieving viability ($\beta = 0.269$, $p < 0.01$). These curvilinear findings are confirmed in Figure 5¹⁰. Figure 5 shows that if a plan was finished up to two months after the

average event time, there is an increased probability of early-stage profitability. However, if a plan was completed more than a month before and more than three months after this average event time, it reduces the chances of viability.

[Table 4 and Figure 5 about here]

Finally, further confirmation of curvilinear plan intraentrainment effects is found when we consider the ancillary measure of venture viability. Table 4 shows that an intraentrained plan increases the chances of achieving a first sale ($\beta=0.195$, $p<0.001$), but has no significant impact if this planning is temporally distant from these activities. In essence, in both the logistic and continuous versions of our results, we find an inverse U-shaped relationship between when planning takes place and viability. Overall, these results support H3.

Beyond this, one further advantage of finding curvilinear intraentrainment effects of a plan is that we are also able, as a by-product of our results, to describe other relevant gestation activities that work alongside plans to promote or limit venture viability. Illustrative examples of these are also shown in Figure 5. Figure 5 shows that a plan is unlikely to be helpful if it is completed around the time when, on average, a founder is defining the market or collecting competitor information. At the same when nascent start to define their market opportunity (some 1.5 months prior to average event time) and start to collect relevant information about competitors (2.5 months), a business plan is unlikely to increase the chances for venture viability. Hence, when the entrepreneurial opportunity is still emerging, and the founder is still trying to find out the nature and shape of the opportunity, then a formal plan may not help in better organizing the venture. Equally, a plan is unlikely to promote venture viability if it is completed at the same time as when, on average, a founder joins a trade association, gets a patent, or hires their first worker. The firm at this stage has already run through a series of milestones. A plan completed at this time is likely to be

unhelpful because it acts as a ceremonial device (Honig and Karlsson, 2004). Figure 5 also shows, however, that if the plan is completed around the time when the founder is talking to customers, doing promotional activities, or is getting the product ready for launch there is a greater likelihood of achieving venture viability. This suggests that a plan is helpful when it is intraentrained with other relevant gestation activities.

4.4. Results of tests for unobserved heterogeneity

Despite positive support for each of the three hypotheses and the PSED II sample being randomly drawn from the US population, the ATT results for planning (Tables 2-4, Figures 3-5) may still be prone to unobserved heterogeneity. To further assess our findings, we first used the methodology proposed by McCarthy et. al., (2013) and found that our matching was invariant to unobserved heterogeneity¹¹. In Tables 2-4, we also report the population ATEs for both early-stage profitability and first sale to identify if there are differences between the sample ATT results and the population ATE results. If so, this would indicate that our sample ATT plan timing-venture viability results cannot be generalized to the wider population of US nascent founders. In terms of H1 (plan sequencing), as Table 2 shows, for our core measure of venture viability, the ATT and ATE results for the average effect (ATE= $\beta=0.078$; sample ATT: $\beta=0.16$) and, crucially, for the period between seven and twelve months (ATE= $\beta=0.068$; sample ATT: $\beta=0.79$) are positive and significant, indicating support for H1. In terms of H2, we also find key similarities in terms of both ATT and ATE results for average effects (ATE= $\beta=0.006$; sample ATT: $\beta=0.005$) and time segments (e.g. 3 to 6 months: ATE= $\beta=0.093$; sample ATT: $\beta=0.105$). This is further evident for H3 which again shows key similarities between the sample ATT and population ATE results (e.g. average effect ATE= $\beta=0.003$; sample ATT: $\beta=0.004$). These findings indicate that the

propensity score matching and the subsequent ATT results are robust to unobservable heterogeneity and that our findings are applicable to the wider population of US nascent founders.

5. Discussion

Our study focuses on the consequences of plan sequencing, duration, and intraentrainment on venture viability. Understanding these effects is important because temporality is an innate feature of organizational emergence and is intrinsic to better theorizing organizational emergence and development (Langley et. al., 2013; Van der Ven and Engleman, 2004). Yet, “it is remarkable how seldom efforts are made to explicitly assess processes as they unfold over time” (Spector and Meier, 2014: 1109). Much of the prior theorizing on time in nascent venturing contexts has focused on understanding how the speed of activities impacts on venture outcomes (Kim et. al., 2015⁴; Brush, Manolova and Edelman, 2008). While these studies provide insights, our study is distinct in that it focuses on sequencing and duration effects. These are lightly studied in the literature. Our study also differs because it is one of the very few studies that focus on planning in relative time (Liao and Gartner, 2006; Lichtenstein et. al., 2007). Our study design is conspicuous because - by taking explicit account of truncation issues, the endogeneity in the planning decision within a longitudinal framework, and by assessing unobservable heterogeneity - we are better able to isolate causality in the plan timing venture viability relationship (Yang and Aldrich, 2012; Burke et. al., 2010). Finally, our results also provide external validity and are extendable to larger populations given the similarity in findings for those that formally plan in our sample (ATT) and the expected mean difference in viability for an individual selected randomly from the sample (ATE).

5.1. Implications for the business plan research

In theorizing and investigating plan timing effects, we see that we contribute in several ways to business plan research. The extant literature has remained oppositional with those from a more purposive synoptic planning approach suggesting that a plan prompts venture outcomes (Delmar and Shane, 2003; Ansoff, 1991) while those from a more emergent or isomorphic perspective suggest that a plan provides few benefits to the founder (Lange et. al., 2007; Honig and Karlsson, 2004). One clear finding from our study is that a plan synchronized with other gestation activities appears to help orchestrate the achievement of venture viability. This supports a more purposive planning perspective and indicates that there are conditions under which it pays to plan planning is beneficial. Consequently, by theorizing and testing intraentrainment effects, we add to the literature on how intraentrainment impacts on organizational outcomes (Crossan et. al., 2005; Perez-Nordtvedt et. al., 2008). This is important because, although the focus in the wider entrainment literature has either been on existing organizations or on extraentrainment (i.e. how temporally synchronized a venture is with a dominant supplier, competitor or customer), intraentrainment effects have been little studied in nascent venturing settings. This is surprising because a key feature of new venturing is that the founder has to internally co-ordinate new venture gestation activities. Nor do we see that the intraentrainment effects have been examined widely in the business planning literature, even though, if a plan is valuable, it as an orchestration device that triggers and monitors the development over time of the emerging venture (Delmar and Shane, 2003). Hence, by theorizing and subsequently investigating plan intraentraining effects, we show the importance of aligning a plan with the pace and rhythm of other activities and that founders that achieve venture viability enact “temporal structuring” (Orlikowski and Yates,

2002) through completing a plan around other relevant gestation activities such as talking to customers or promoting the venture.

Temporality in nascent venture settings, like other environments that are either uncertain or turbulent, however, is not just subject to temporal patterning (intraentrainment), whereby organizational fit is solely determined by how well the founder attunes their activities. Our study also shows that temporal ordering (sequencing) is important in shaping venture viability, implying that founders manage across multiple time frames and are successful when temporal ordering and patterning are both congruent (Gersick, 1994). In doing so, our findings also resonate with earlier studies that have implied that formal planning is unlikely to prompt venture viability and, given this, founders are better off following a more emergent strategy. For example, our findings on the duration of planning are in line with that proposed by Lange et. al., (2007) who identified that spending too long on a plan is likely to have deleterious impacts. Our findings suggest that if a plan is completed too early, the plan is likely to just sit on the proverbial shelf, gathering dust, particularly if it is conducted alongside other gestation activities such as finding out about competitors or defining the market. In such instances, planners would be better off enacting rather scripting a plan because it does not increase the likelihood of venture viability. Equally, if a plan is scripted either much later relative to other activities or much later in absolute time, there are also likely to be few benefits: it is unlikely to cue, monitor or meter future activities. In such situations, particularly when other exchange or legitimation activities have already been undertaken there appears little value in writing a plan, suggesting that a plan is an isomorphic device that is mainly useful in helping the founder's venture to assume a 'taken for granted' status. In sum, we see that one further contribution of this study is to offer fresh insights into when – and when not – a plan is effective in promoting venture

viability. Writing a plan *per se* is unlikely, as purposive planners imply, to inevitably lead to better founder outcomes. Its benefits are contingent, particularly on whether a plan is written alongside other gestation activities. Equally, however, our findings also show that there are boundary conditions to other strands of the business plan literature. Although the isomorphic approach does not specifically focus on plan temporality in its extant theorizing, what our study shows is, as with emergent strategic approaches to planning, that there are conditions under which founders are better off evaluating rather than enacting a new venture.

In sum, therefore, seen from a ‘temporal lens’ (Ancona et. al., 2001), our study provides important insights for business plan research by identifying the nuanced impact of plans on venture viability. Hence, by focusing on a nascent setting, our study extends earlier research that identifies that managers, scientists, and innovators often have to act as temporal brokers between clock based schedules and intraentraining their activities (Dougherty et. al., 2013).

5.2. Practical implications

Our study also has important implications for nascent entrepreneurs and educators. For aspiring entrepreneurs, one of the advantages of our research design is that by using propensity score matching we are able to isolate plan-performance effects from selection effects (i.e. observable entrepreneurial and venture characteristics, and pre-Wave A gestation activities). As we suggested earlier on, this is important because one valid criticism of earlier business plan research is that by failing to control for differences in the decision to plan, it is likely that the factors that shape the decision to plan are also likely to impact on subsequent venture outcomes (Burke et. al., 2010). Consequently, by separating out selection from performance effects, our subsequent findings show, once heterogeneity in founder and

venture profiles is accounted for, that it is beneficial ~~pays for~~ founders to plan but that they should complete their plan relatively quickly: if they take too long to complete the plan, the information in the plan is likely to become redundant. Moreover, our evidence suggests that a plan needs to be synchronized with other activities. One of the practical by-products of our study is it is able to describe and illustrate a range of specimen gestation activities that a founder should have completed alongside a plan if they wish to achieve venture viability. Plans were, however, less efficacious if they were done around the same time as early activities such as defining the market or if they were aligned with later gestation activities. While we see that these results offer practical insights, one caveat is that they are average effects. We know that the means by which founders arrive at venture viability are varied, contingent and messy (Brush et. al., 2008; Lichtenstein et. al., 2007) and, as such, it is unlikely that our illustrative gestation activities provides a prescription that is germane to all founders.

Our study also has implications for educators. In the teaching of business planning, the emphasis has shifted towards more emergent improvisational approaches such as effectuation, bricolage and lean start-up, largely because weaknesses have been identified in more rational synoptic approaches to business planning. While our study does not test the validity of these improvisational approaches, it does expose the advantages of timing a plan appropriately. This suggests, therefore, that there are advantages to a synoptic approach to teaching new venture creation and that there are grounds for teaching practice to re-orientate back to this approach. Yet, our results also suggest that educators should sensitize their students and entrepreneurs to plan timing effects. While practice varies, one typical model is to teach business planning on its own, independent of other gestation activities and usually well before there is any prospect of a student ever embarking on gestation activity. The

teaching of business plans in this way is tempting because it can act as a substitute for very many of the core activities involved in venture emergence and thereby give students and entrepreneurs some insights into entrepreneurial processes. However, what our study shows is that if these scripts are not synchronized with other gestation activities, they are likely to be of limited value. This suggests that educators could usefully emphasize to their students or entrepreneurs that the ability of plans to help direct gestation activities is dependent on writing a plan in the midst of setting up a venture.

5.3. *Limitations and future directions*

Although our study is designed to better isolate the relationship between both absolute and relative plan timing effects on venture viability, one limitation of our study is that it does not consider the temporal modalities (past, present and future) of the founder's 'inner time'. Hence, we are not able to access how founders use formal plans to "relive the past and prelive the future in the present" (Huy, 2001: 608). Equally, we are not able to assess other individual temporal differences. For example, some founders may be more predisposed to being time urgent (tendency towards the belief in scarcity of temporal resources); may be more able to work on several tasks at once (polychronicity) rather than just one task at a time (monochronicity); or have a pacing style that emphasizes meeting deadlines (deadline action style) rather than focusing on either finishing activities well before (~~early action style~~) the deadline (early action style) or at a constant pace (steady action style) (Slocombe and Bluedorn, 1999; Blount and Janicik, 2002; Mohammed and Harrison, 2013). We see that these are potentially interesting areas for a future research agenda that seeks to build on our quantitative study by exploring through qualitative research why founders may unduly delay planning and struggle to achieve the intraentrainment advantages of planning alongside other

gestation activities. More broadly, although we control for external factors in the decision to plan, one downside of our focus on intraentrainment is that we do not account fully for the impact on extraentrainment on plan timing effects. Even though we focus on intraentrainment because of the agentic nature of nascent venturing, it might be that external actors – as Honig and Karlsson (2004) suggest - might be pivotal in pacing gestation activities. One further limitation is that the plan timing-viability relationship only represents two points on the ‘entrepreneurial journey’ (McMullen and Dimov, 2013). We have focused on two important milestones in achieving venture viability because they represent landmark steps in the development of a new venture. Nonetheless, although we see these measures as the ‘end of the beginning’ in a determining whether or not a founder has overcome what we would term the ‘liability of emergence’, we are unable to go further forward in time and examine the role that a plan plays in either supporting attempts to overcome the ‘liability of newness’ or the subsequent growth of the venture. What then may transpire is that the venture is economically marginal and provides few tangible benefits going forward either to the founder or society. Similarly, our design does not allow us to chart the evolution of the business plan. We simply cannot observe from the data the contents of these plans; whether crafting the plan rather than the plan itself promoted gestation activities; any help the founders may have had with their plan; how the founders viewed these plans; or how our findings extend to other cultural or economic contexts.

We see that future research can promote further insights into the relationship between plan-performance effects. This study has been focused on plan formality. We recognize that there are other dimensions to plans such as plan comprehensiveness or sophistication. We have not been able to focus on these dimensions because of data constraints. Equally, because of the prevailing debate in the extant literature has been about the efficacy of formal plans,

the individual value of particular forms of informal planning such as unwritten plans or the use of mental models schematics has been outside of the scope of this study. We see that future research ~~may~~ perhaps through the use of non-experimental methods such as archival designs, daily diary studies and ethnographic direct observation ~~may~~ could ~~extend research to~~ uncover how other quality dimensions of formal plans impact on plan-performance effects. Similarly, although there are normative and mimetic norms and conventions about what a formal plan looks like (Honig and Karlsson, 2004), less is known about what distinguishes different types of informal planner and how these types use informal planning to make sense of nascent venturing. Moreover, further research could build on our approach by identifying how founders script plans to meet more proximal goals, and intraentrain and entrain these activities. For example, future research could fruitfully examine the role that signaling plays in plan timing: who sends signals about the plan, how are they received and actioned? More broadly, although none of us can taste, smell, feel or see time, we see that our study points to other directions of interest for scholars similarly interested in temporal effects. In better understanding temporality - what Hall (1983: 6) calls the ‘hidden cultural grammar’ - we see that management scholars could fruitfully examine how intraentrainment effects impact on existing and developing businesses. For example, Honig and his colleagues find few benefits from plans for new ventures. This reflects that plans as an isomorphic device. However, what may also explain these impacts – like that of the announcement of quarterly or annual financial results or annual performance reviews for workers – may be due to a temporal misfit between such activities and the internal rhythms of the venture. ~~Indeed, as~~ Pierce and Aguinis (2013) suggest, there is a need for entrepreneurship, strategy and management scholars to better comprehend curvilinear effects that reflect contingencies in entrepreneurial and managerial practices.

6. Conclusions

Understanding the role of business plans is clearly important for understanding nascent entrepreneurial activity and one which has attracted considerable – but conflicting - research attention. In this work, we theorize and empirically examine plan timing sequencing, duration and synchronization effects on new venture viability. Our findings show that a plan completed early in absolute time increases the likelihood of venture viability but that it is contingent on plan duration and being synchronized with other gestation activities. By adopting a temporal lens to better understanding the plan timing-performance relationship, this present study has generated a number of insights into the contingent nature of this relationship, thereby highlighting some of the boundary conditions of the divergent theoretic approaches to business plans. Our results are also relevant for entrepreneurs seeking answers as to when and for how long to they should plan for their venture and for educators seeking to advise aspiring entrepreneurs in developing a viable new venture.

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Figure 1a: The Pre-Matching Distribution of Predicted Probabilities for Completing a Formal Plan

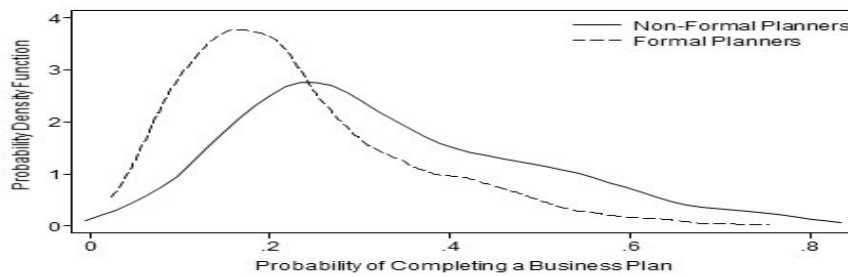
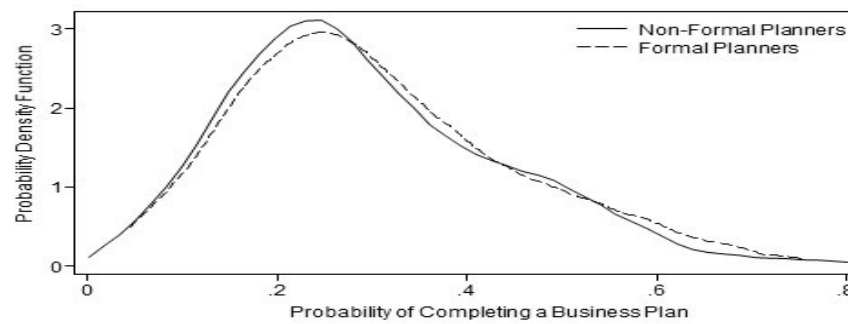


Figure 1b: The Post-Matching Distribution of Predicted Probabilities for Completing a Formal Plan



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Table 1: Summary Statistics and Correlation Matrix

Variable	Mean	SD	2	3	4	5	6	7	8
1) Venture Viability	0.22	0.41							
2) Achieved 1st Sale	0.66	0.47	0.38						
3) Process Duration (months)	43.51	33.17	-0.23	0.16					
4) Age at Entry (months)	21.07	23.51	0.00	0.13	0.71				
5) Formal Planners	0.25	0.43	0.14	0.08	0.03	0.07			
6) Event Time Formal Plan (Absolute time)	14.17	18.11	-0.03	0.03	0.53	0.61	-0.07		
7) Time Spend on Formal Plan (months)	7.19	11.73	0.00	0.05	0.17	0.14	-0.02	0.43	
8) Event Time of Formal Plan (Relative time)	-2.00	10.45	-0.01	-0.08	-0.11	-0.03	-0.15	0.57	0.41

Summary Statistics and correlation matrix are based on 1,088 observations. All correlations above 0.1 are significant at least at the 5% level

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Figure 2a: Comparison of venture viability and non-viability in absolute time using four specimen BRIE markers

			Nonviable	Viable
B	Boundaries	Government Registration	22.84	24.59
R	Resources	Product Development	17.64	17.84
I	Intentions	Business Plan Initiated	16.57	20.74
E	Exchange	Unemployment Insurance Taxes	27.62	32.25

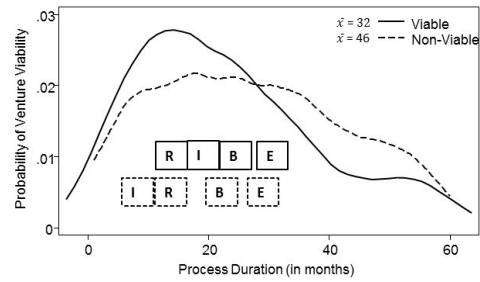


Figure 2b: Comparison of venture viability and non-viability in average event time using four specimen BRIE markers

			Nonviable	Viable
B	Boundaries	Government Registration	0.33	0.32
R	Resources	Product Development	-0.78	0.14
I	Intentions	Business Plan Initiated	-2.35	-1.58
E	Exchange	Unemployment Insurance Taxes	5.04	3.42

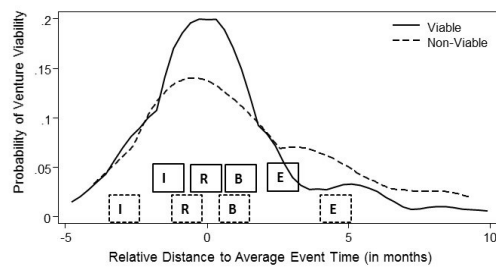


Table 2: Logistic Regression Results of Absolute Time Effects of Formal Planning on Venture Viability and 1st Sale (Hypothesis 1)

Time (months) spent in gestation	Dep. Variable 1=Venture Viability (early stage profitability); 0=non-viable ventures)	Dep. Variable 1=Venture Viability (early stage profitability); 0=non-viable ventures)	Dep. Variable (1=First Sale; 0=no sales)	Dep. Variable (1=First Sale; 0=no sales)
	ATT results	ATE results	ATT results	ATE results
Average Effect (Total Months in gestation)	0.160*** (0.045)	0.078* (0.046)	0.055 (0.051)	0.027 (0.047)
First 2/3 months	-0.027 (0.018)	0.011 (0.025)	-0.042* (0.024)	-0.011 (0.039)
Months 4/6	0.022 (0.019)	0.049 (0.031)	-0.122*** (0.026)	-0.029 (0.031)
Months 7/12	0.079*** (0.026)	0.068* (0.039)	0.099*** (0.023)	0.090*** (0.034)
Months 13/24	0.032 (0.028)	0.040 (0.041)	0.038** (0.017)	0.031 (0.023)
Months 25/36	0.094*** (0.029)	0.071 (0.043)		
Months 37/48	0.109*** (0.029)	0.085* (0.045)		

Standard Errors in parentheses * p<0.1, ** p<.05, *** p<.01

Figure 3: Flexible parametric survival specification of the relationship between absolute plan timing and venture viability (Hypothesis 1)

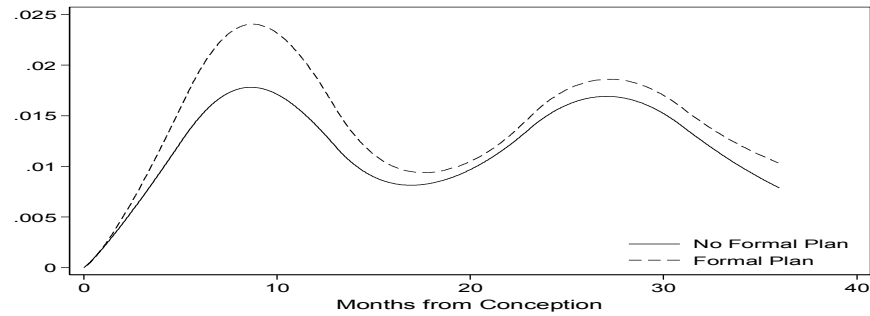


Table 3: Logistic Regression Results of Plan Duration Effects on Venture Viability and 1st Sale (*Hypothesis 2*)

Time spent on formal plan	Dep. Variable 1=Venture Viability (early stage profitability); 0=non- viable ventures) ATT results	Dep. Variable 1=Venture Viability (early stage profitability); 0=non- viable ventures) ATE results	Dep. Variable (1=First Sale; 0=no sales) ATT results	Dep. Variable (1=First Sale; 0=no sales) ATE results
Average Effect (Total time spent on formal plan)	-0.005*** (0.001)	-0.006*** (0.001)	-0.001 (0.001)	-0.001 (0.001)
Time [0 to 3 months on plan]	-0.202*** (0.045)	-0.144*** (0.029)	0.137** (0.065)	0.108* (0.057)
Time [3 to 6 months on plan]	-0.093* (0.053)	-0.105** (0.045)	-0.052*** (0.019)	-0.057*** (0.018)
Time [6 to 12 months on plan]	-0.014 (0.023)	-0.013 (0.021)	-0.097** (0.038)	-0.088*** (0.028)
Time [>12 months on plan]	0.025 (0.021)	0.022 (0.021)	0.026 (0.037)	0.026 (0.036)

Standard Errors in parentheses * p<0.1, ** p<.05, *** p<.01

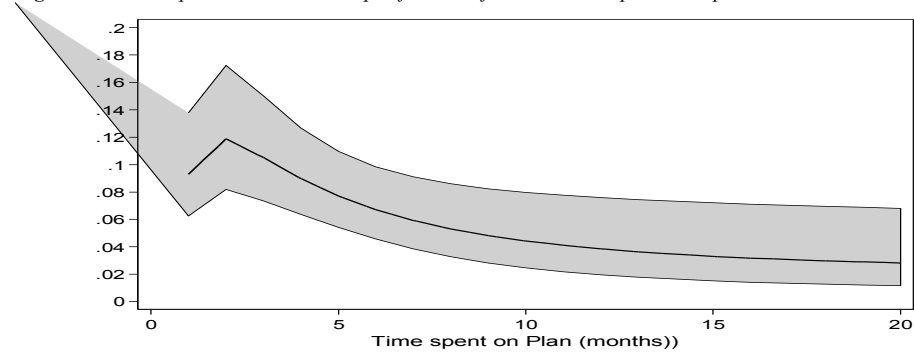
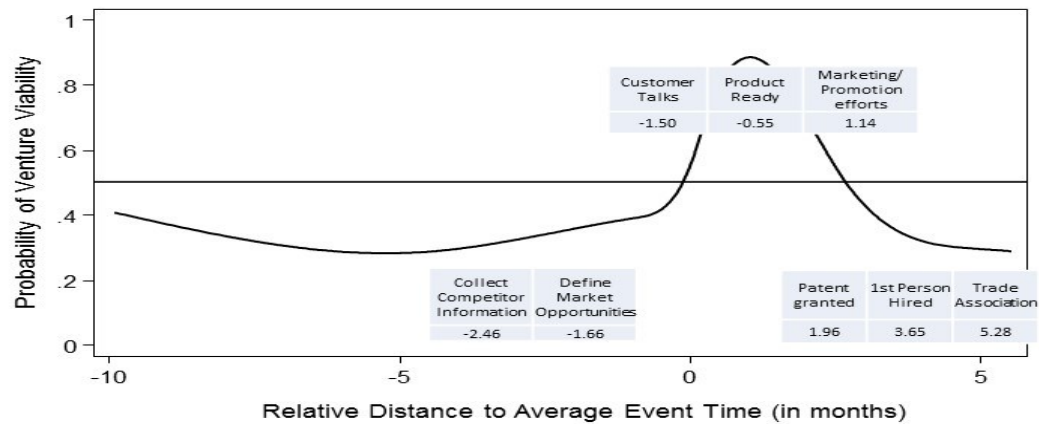
Figure 4: Flexible parametric survival specification of the relationship between plan duration and venture viability (*Hypothesis 2*)

Table 4: Logistic Regression Results for Relative Event Plan Timing Effects on Venture Viability and 1st Sale (*Hypothesis 3*)

Months formal plan was completed before (-) / after (+) average event time	Dep. Variable 1=Venture Viability (early-stage profitability); 0=non-viable ventures) ATT results	Dep. Variable 1=Venture Viability (early-stage profitability); 0=non-viable ventures) ATE results	Months formal plan was completed before (-) / after (+) average event time	Dep. Variable (1=First Sale; 0=no sales) ATT results	Dep. Variable (1=First Sale; 0=no sales) ATE results
Average Effect	0.004** (0.002)	0.003** (0.002)	Average Effect	-0.000 (0.002)	-0.002 (0.002)
Time [-20 to -3 months]	0.003 (0.004)	0.004 (0.004)	Time [-20 to -5 months]	-0.007 (0.005)	-0.003 (0.004)
Time [-3 to -0.5 months]	-0.156* (0.083)	-0.150** (0.073)	Time [-5 to -1.5 months]	0.195*** (0.045)	0.186*** (0.038)
Time [+0.5 to +2 months]	0.269*** (0.059)	0.195*** (0.050)	Time [-1.5 to +0.5 months]	-0.040 (0.093)	-0.071 (0.090)
Time [later than +3 months]	-0.017*** (0.006)	-0.018*** (0.006)	Time [later than +1 months]	-0.006 (0.004)	-0.006* (0.004)

Standard Errors in parentheses * p<0.1, ** p<0.05, *** p<0.01

Figure 5: Flexible parametric survival specification of the relationship between plan intraentrainment and venture viability (*Hypothesis 3*)

Appendix: *List of Gestation activities*

PSED Indicator		Average Absolute Event Time	Median Absolute Event Time	Average Relative Event Time
A11	In what month and year was the name registered with the appropriate government agency?	24.19	11	0.32
B9	In what month and year was any physical space first used for the new business?	17.69	5	-1.64
C3	In what month and year has the legal form been formally established by registering with the appropriate government agency?	23.40	8	-0.54
C5	In what month and year was liability insurance for this new business first purchased?	22.96	11	0.69
D3	In what month and year did you start preparing the business plan?	17.55	5	-2.19
D4	In what month and year was the first version of the business plan completed?	19.89	8	-0.72
D8	In what month and year was the product or service completed and ready for sale	17.70	6	-0.54
D10	In what month and year did marketing or promotional efforts begin?	24.36	12	1.14
D12	In what month and year was the proprietary technology or process developed for this new business?	27.96	10	-0.17
D14	In what month and year did preparation begin for an application of a patent, copyright, or trademark?	27.40	14	1.13
D15	In what month and year was a patent, copyright, or trademark granted?	31.30	15	1.96
D17	In what month and year have any major items like equipment, facilities, or property been purchased, leased or rented specifically for this new business?	23.01	10	-0.06
D19	In what month and year have purchases been made of any raw materials, inventory, supplies, or components specifically for this new business?	21.58	8	-0.73
D21	In what month and year has an effort been made to talk with potential customers about the product or service of this new business?	18.62	5	-1.50
D23	In what month and year has an effort been made to collect information about the competitors of this new business?	14.99	3	-2.86
D25	In what month and year did defining the market opportunities begin for this new business?	18.32	6	-1.81
D27	In what month and year have any financial projections, such as income or cash flow statements or break-even analyses, been developed?	21.73	9	-0.15
D29	In what month and year were the regulatory requirements for this new business determined?	20.17	8	-1.00
E2	In what month and year did you first seek outside funding for this new business?	23.40	14	1.51
E4	In what month and year did the first outside funding begin for this new business?	25.57	16	3.25
E6	In what month and year was supplier credit first established?	24.77	11	0.52
E8	In what month and year was the first person hired for this new business?	31.13	17	3.65
E12	In what month and year was the first exclusive account opened for this new business?	24.58	10	0.02
E19	In what month and year was an accountant retained for this new business?	26.54	11	0.26
E21	In what month and year was a lawyer retained for this new business?	24.93	12	0.51
E23	In what month and year did the new business first become a member of a trade or industry association?	31.87	19	5.28
E25	In what month and year did this new business first get a listing in the phone book, a business e-mail, or	21.91	9	0.00

	website?			
E27	In what month and year was the application for a Federal EIN made	23.16	11	-0.24
E29	In what month and year was the application for a “doing business as” name filed?	24.87	11	0.26
E31	In what month and year was the first state unemployment insurance payment made for this new business?	29.92	18	4.93
E33	In what month and year was the first federal social security payment made for this new business?	28.68	16	5.71
E35	In what month and year was the first federal income tax return filed for this new business?	31.76	18	7.60
E37	In what month and year was this new business first listed in Dun and Bradstreet?	39.69	25	8.53
R2	In what month and year has this new business directly received any loans or financial support, including any loans or investments from you (or other owners)?	31.05	16	3.29

¹ One potential problem with examining the causal relationship between, for example, when a plan was completed and the achievement of venture viability is that of reverse causality. If a plan was completed in month 12 and the founder also achieved venture viability in month 12, it is difficult to know if the plan contributed to venture viability. To ensure that cause (planning) always precedes effect (venture viability) in our subsequent logistic regression models, we use the probability of venture viability in time t+1 as our dependent variable and, for formal planning, use time up until t+1 as the explanatory variable across time different time periods. Similarly, following Hoetker (2007), we infer inflection points by compare non/significant coefficients in our models.

² We assessed whether including these ‘still trying’ subjects biased our results. T-tests for the differences in mean values between those still trying to create a new venture and those that disbanded or created a viable venture identified slight educational ($\beta=0.23$, $p<0.05$) and work experience ($\beta=-0.13$, $p<0.05$) differences but, crucially, not in terms of formal plans ($\beta=0.01$, n.s.).

³ PSED II data allow for the use of other robustness checks. However, other potential proxies for venture viability such as the employment of a first member of staff are likely to introduce their own particular biases. For example, although employing a first worker may also be seen as a venture viability milestone, not all entrepreneurs create employment (Henrekson and Johanson, 2010). We therefore include these variables in our later average event time calculation, but do not use them as additional dependent variables.

⁴ Besides Figure 1a, mean (t-test) and distributional (Kolmogorov-Smirnov test) tests revealed that before matching was undertaken, the better educated, innovators, and those seeking finance and growth were more likely to plan formally. These tests also revealed that sectoral experience, and the need for external finance influenced the prospects of achieving venture viability (full results are available on request from the authors).

⁵ Again, we conducted, post propensity score matching, mean (t-test results) and distributional (Kolmogorov-Smirnov test) tests. These tests revealed that there were no differences in the core mean values for either planners or non-planners (i.e. differences have been levelled out). Moreover, p-values ($p<0.01$) show that the distributional overlap has been achieved through matching, indicating that post matching there were no difference between treatment and control group (results available on request from authors).

⁶ For Figures 3 and 4, we used a flexible parametric survival specification which treats right censored subjects as ‘still trying’ to create a new venture and also controls for the age of the venture at the first interview (Yang and Aldrich, 2012). We made no explicit assumption about the underlying functional form, thus allowing for non-linearity (Royston and Lambert, 2011). We also compared the results from the Kaplan-Meier survival functions for both the traditional Cox model and a flexible parametric estimator. Overall, the curves behave similarly (results are available upon request from the authors). In Figure 5, we used a ‘piece-wise’ curve fitting (splines) approach since this better depicts non-linearities (Desquilbet and Mariotti 2010; Royston and Sauerbrei 2007). The dependent variable is non/achievement of viability. Each spline (or zone) can have different (and additive) regression coefficients for the effect of relative plan time on non/achievement of viability.

⁷ This methodology estimates the effect of treatment (planning) when selection on unobserved variables exists. The estimator trims the number of observations using only observations with a propensity matching score close to the bias-minimizing propensity score and calculates the bias adjusted treatment (plan) effects,

⁸ To corroborate the external validity of our ATE estimates, we examined if the non-matched sample compositions differ from the sample used to derive the treatment effects. We found only a few differences (i.e. in looking for financing ($p<0.01$), start-up motivation ($p<0.01$) and higher ability expectations ($p<0.01$)). All other variables did not differ in means and simultaneity in distributions, indicating that we could generalize our findings to larger populations.

⁹ The BRIE model is derived from Katz and Gartner's (1988) original model of the properties of emerging ventures. The model suggests that there are four core activities: forming an intention, creating a boundary, garnering resources and conducting exchange activities. The four chosen BRIE markers are used for illustrative purposes only.

¹⁰ Figure 5 shows on the y-axis, the likelihood of a founder achieving viability (0=no probability; 0.5=venture viability/no viability is equally likely; 1=achieved venture viability) and, on the x-axis, when the plan was completed relative to other gestation activities (ranges from negative (the plan precedes other activities) to positive (the plan follows other activities), with a plan time of zero indicating planning is synchronized with other activities).

¹¹ Our results – available on request from the authors – revealed for example that, on average, the effect of relative plan timing on venture viability is positive and significant ($\beta=0.105$, $p<0.05$) and that, when disaggregated into specific time periods, there is a significant and positive plan effect for months seven to twelve ($\beta=0.149$, $p<0.05$). These results also show that for other time periods the plan effects are insignificant. This is in line with our main results.